

CLAIMS

1. A thru-hull light comprising:
 - 2 a lamp housing having a hollow interior;
 - 4 a thru-hull fitting assembly connected to a forward end of the lamp housing for mounting the forward end of the lamp housing in a hole in the hull of a vessel in a water-tight fashion;
 - 6 a lamp;
 - 8 means for mounting the lamp in the interior of the lamp housing;
 - 10 a sapphire window extending across the forward end of the lamp housing for permitting light from the lamp to be transmitted through the window; and
 - means for providing a water-tight seal between the sapphire window and the forward end of the lamp housing to prevent water from entering the interior of the lamp housing.
2. The thru-hull light of Claim 1 and further comprising a reflector mounted in the interior of the lamp housing and surrounding the lamp.
3. The thru-hull light of Claim 2 wherein the reflector has an outer elliptical section.
4. The thru-hull light of Claim 2 wherein the reflector has an outer elliptical section and an inner parabolic section.
5. The thru-hull light of Claim 1 and further comprising an end cap and means for securing the end cap to a rearward end of the lamp housing in a water-tight fashion.
6. The thru-hull light of Claim 1 and further comprising an electrical circuit connected to the lamp and including means for shutting off a source of power to the lamp upon the detection of a predetermined excessive heat condition.
7. The thru-hull light of Claim 1 and further comprising an electrical circuit connected to the lamp and including means for shutting off a source of power to the lamp upon the detection of leakage of water into the lamp housing.

8. The thru-hull light of Claim 1 and further comprising an electrical circuit connected
2 to the lamp and including a ballast and means for shutting off a source of power to the ballast in
the event of the detection of a fault in the lamp.

9. The thru-hull light of Claim 8 wherein the electrical circuit further includes means
2 for indicating power status and/or fault status.

10. The thru-hull light of Claim 1 wherein the lamp has a color temperature of at least
2 about five thousand K.

11. A thru-hull light comprising:
2 a lamp housing having a hollow interior;
a thru-hull fitting assembly connected to a forward end of the lamp housing for mounting
4 the forward end of the lamp housing in a hole in the hull of a vessel in a water-tight fashion;
a lamp;
6 means for mounting the lamp in the interior of the lamp housing;
a reflector mounted in the interior of the lamp housing and having an elliptical section
8 surrounding the lamp;
a window extending across the forward end of the lamp housing for permitting light from
10 the lamp to be transmitted through the window; and
means for providing a water-tight seal between the window and the forward end of the lamp
12 housing to prevent water from entering the interior of the lamp housing.

12. The thru-hull light of Claim 11 wherein the window is made of a material selected
2 from the group consisting of sapphire, quartz and glass.

13. The thru-hull light of Claim 11 wherein the means for mounting the lamp includes
2 a socket.

14. The thru-hull light of Claim 11 wherein the reflector also has an inner parabolic
2 section surrounded by the elliptical section, the inner parabolic section having an outer diameter
substantially equal to a diameter of the window.

15. The thru-hull light of Claim 11 and further comprising an end cap and means for
2 securing the end cap to a rearward end of the lamp housing in a water-tight fashion.

16. The thru-hull light of Claim 11 and further comprising an electrical circuit
2 connected to the lamp and including means for shutting off a source of power to the lamp upon
the detection of a predetermined excessive heat condition.

17. The thru-hull light of Claim 11 and further comprising an electrical circuit
2 connected to the lamp and including means for shutting off a source of power to the lamp upon
the detection of leakage of water into the lamp housing.

18. The thru-hull light of Claim 11 and further comprising an electrical circuit
2 connected to the lamp and including a ballast and means for shutting off a source of power to the
ballast in the event of the detection of a fault in the lamp.

19. The thru-hull light of Claim 18 wherein the electrical circuit further includes means
2 for indicating power status and/or fault status.

20. The thru-hull light of Claim 11 wherein the lamp has a color temperature of at least
2 about five thousand K.

21. A thru-hull light comprising:
2 a lamp housing having a hollow interior;
a thru-hull fitting assembly connected to a forward end of the lamp housing for mounting
4 the forward end of the lamp housing in a hole in the hull of a vessel in a water-tight fashion;
a lamp;
6 means for mounting the lamp in the interior of the lamp housing;

a window extending across the forward end of the lamp housing for permitting light from
8 the lamp to be transmitted through the window;

means for providing a water-tight seal between the window and the forward end of the lamp
10 housing to prevent water from entering the interior of the lamp housing; and

an electrical circuit connected to the lamp and including means for shutting off a source of
12 power to the lamp upon the detection of a predetermined excessive heat condition.

22. The thru-hull light of Claim 21 and further comprising a reflector mounted in the
2 interior of the lamp housing and surrounding the lamp.

23. The thru-hull light of Claim 22 wherein the reflector has an inner parabolic section.

24. The thru-hull light of Claim 22 wherein the reflector has an outer elliptical section.

25. The thru-hull light of Claim 21 and further comprising an end cap and means for
2 securing the end cap to a rearward end of the lamp housing in a water-tight fashion.

26. The thru-hull light of Claim 21 wherein the window is made of a material selected
2 from the group consisting of sapphire, quartz and glass.

27. The thru-hull light of Claim 21 wherein the electrical circuit connected to the lamp
2 further includes means for shutting off a source of power to the lamp upon the detection of
leakage of water into the lamp housing.

28. The thru-hull light of Claim 21 wherein the electrical circuit connected to the lamp
2 further includes a ballast and means for shutting off a source of power to the ballast in the event
of the detection of a fault in the lamp.

29. The thru-hull light of Claim 28 wherein the electrical circuit connected to the lamp
2 further includes means for indicating power status and/or fault status.

30. The thru-hull light of Claim 21 wherein the lamp has a color temperature of at least
2 about five thousand K.

31. A thru-hull light comprising:

2 a lamp housing having a hollow interior;

a thru-hull fitting assembly connected to a forward end of the lamp housing for mounting
4 the forward end of the lamp housing in a hole in the hull of a vessel in a water-tight fashion;
a lamp;

6 means for mounting the lamp in the interior of the lamp housing;

a window extending across the forward end of the lamp housing for permitting light from
8 the lamp to be transmitted through the window;

means for providing a water-tight seal between the window and the forward end of the lamp
10 housing to prevent water from entering the interior of the lamp housing; and

an electrical circuit connected to the lamp and including means for shutting off a source of
12 power to the lamp upon the detection of leakage of water into the lamp housing.

32. The thru-hull light of Claim 31 and further comprising a reflector mounted in the
2 interior of the lamp housing and surrounding the lamp.

33. The thru-hull light of Claim 32 wherein the reflector has an outer elliptical section.

34. The thru-hull light of Claim 32 wherein the reflector has an inner parabolic section.

35. The thru-hull light of Claim 31 and further comprising an end cap and means for
2 securing the end cap to a rearward end of the lamp housing in a water-tight fashion.

36. The thru-hull light of Claim 31 wherein the window is made of a material selected
2 from the group consisting of sapphire, quartz and glass.

37. The thru-hull light of Claim 31 wherein the electrical circuit connected to the lamp
2 further includes means for shutting off a source of power to the lamp upon the detection of a
predetermined excessive heat condition.

38. The thru-hull light of Claim 31 wherein the electrical circuit connected to the lamp
2 further includes a ballast and means for shutting off a source of power to the ballast in the event
of the detection of a fault in the lamp.

39. The thru-hull light of Claim 38 wherein the electrical circuit connected to the lamp
2 further includes means for indicating power status and/or fault status.

40. The thru-hull light of Claim 31 wherein the lamp has a color temperature of at least
2 about five thousand K.

41. A thru-hull light comprising:
2 a lamp housing having a hollow interior;
a thru-hull fitting assembly connected to a forward end of the lamp housing for mounting
4 the forward end of the lamp housing in a hole in the hull of a vessel in a water-tight fashion;
a lamp;
6 means for mounting the lamp in the interior of the lamp housing;
a window extending across the forward end of the lamp housing for permitting light from
8 the lamp to be transmitted through the window;
means for providing a water-tight seal between the window and the forward end of the lamp
10 housing to prevent water from entering the interior of the lamp housing; and
an electrical circuit connected to the lamp and including a ballast and means for shutting
12 off a source of power to the ballast in the event of the detection of a fault in the lamp.

42. The thru-hull light of Claim 41 and further comprising a reflector mounted in the
2 interior of the lamp housing and surrounding the lamp.

43. The thru-hull light of Claim 42 wherein the reflector has an inner parabolic section.

44. The thru-hull light of Claim 42 wherein the reflector has an outer elliptical section.

45. The thru-hull light of Claim 41 and further comprising an end cap and means for
2 securing the end cap to a rearward end of the lamp housing in a water-tight fashion.

46. The thru-hull light of Claim 41 wherein the window is made of a material selected
2 from the group consisting of sapphire, quartz and glass.

47. The thru-hull light of Claim 41 wherein the electrical circuit connected to the lamp
2 further includes means for shutting off a source of power to the lamp upon the detection of a
predetermined excessive heat condition.

48. The thru-hull light of Claim 41 wherein the electrical circuit connected to the lamp
2 further includes means for shutting off a source of power to the lamp upon the detection of
leakage of water into the lamp housing.

49. The thru-hull light of Claim 41 wherein the electrical circuit connected to the lamp
2 further includes means for indicating power status and/or fault status.

50. The thru-hull light of Claim 41 wherein the lamp has a color temperature of at least
2 about five thousand K.

51. A thru-hull light comprising:
2 a lamp housing having a hollow interior;
a thru-hull fitting assembly connected to a forward end of the lamp housing for mounting
4 the forward end of the lamp housing in a hole in the hull of a vessel in a water-tight fashion;
a lamp;
6 means for mounting the lamp in the interior of the lamp housing;
a window extending across the forward end of the lamp housing for permitting light from
8 the lamp to be transmitted through the window;
means for providing a water-tight seal between the window and the forward end of the lamp
10 housing to prevent water from entering the interior of the lamp housing; and
an electrical circuit connected to the lamp and including a ballast and means for indicating
12 power status and/or fault status.

52. The thru-hull light of Claim 51 and further comprising a reflector mounted in the
2 interior of the lamp housing and surrounding the lamp.

53. The thru-hull light of Claim 52 wherein the reflector has an inner parabolic section.

54. The thru-hull light of Claim 52 wherein the reflector has an outer elliptical section.

55. The thru-hull light of Claim 51 and further comprising an end cap and means for
2 securing the end cap to a rearward end of the lamp housing in a water-tight fashion.

56. The thru-hull light of Claim 51 wherein the window is made of a material selected
2 from the group consisting of sapphire, quartz and glass.

57. The thru-hull light of Claim 51 wherein the electrical circuit connected to the lamp
2 further includes means for shutting off a source of power to the lamp upon the detection of a
predetermined excessive heat condition.

58. The thru-hull light of Claim 51 wherein the electrical circuit connected to the lamp
2 further includes means for shutting off a source of power to the lamp upon the detection of
leakage of water into the lamp housing.

59. The thru-hull light of Claim 51 wherein the electrical circuit connected to the lamp
2 further includes means for shutting off a source of power to the ballast in the event of the
detection of a fault in the lamp.

60. The thru-hull light of Claim 51 wherein the lamp has a color temperature of at least
2 about five thousand K.

61. A thru-hull light comprising:
2 a lamp housing having a hollow interior;

a thru-hull fitting assembly connected to the forward end of the lamp housing for mounting
4 the forward end of the lamp housing in a hole in the hull of a vessel in a water-tight fashion;
a lamp having a color temperature of at least about five thousand K;
6 means for mounting the lamp in the interior of the lamp housing;
a window extending across the forward end of the lamp housing for permitting light from
8 the lamp to be transmitted through the window; and
means for providing a water-tight seal between the window and the forward end of the lamp
10 housing to prevent water from entering the interior of the lamp housing.

62. The thru-hull light of Claim 61 and further comprising a reflector mounted in the
2 interior of the lamp housing and surrounding the lamp.

63. The thru-hull light of Claim 62 wherein the reflector has an inner parabolic section.

64. The thru-hull light of Claim 62 wherein the reflector has an outer elliptical section.

65. The thru-hull light of Claim 61 and further comprising an end cap and means for
2 securing the end cap to a rearward end of the lamp housing in a water-tight fashion.

66. The thru-hull light of Claim 61 and further comprising an electrical circuit
2 connected to the lamp and including means for impeding a source of power to the lamp upon the
detection of a predetermined excessive heat condition.

67. The thru-hull light of Claim 61 and further comprising an electrical circuit
2 connected to the lamp and including means for shutting off a source of power to the lamp upon
the detection of leakage of water into the lamp housing.

68. The thru-hull light of Claim 61 and further comprising an electrical circuit
2 connected to the lamp and including a ballast and means for shutting off a source of power to the
ballast in the event of the detection of a fault in the lamp.

69. The thru-hull light of Claim 68 wherein the electrical circuit further includes means
2 for indicating power status and/or fault status.

70. The thru-hull light of Claim 61 wherein the window is made of a material selected
2 from the group consisting of sapphire, quartz and glass.

71. A thru-hull light comprising:
2 a lamp housing having a hollow interior;
a thru-hull fitting assembly connected to a forward end of the lamp housing for mounting
4 the forward end of the lamp housing in a hole in the hull of a vessel in a water-tight fashion;
a lamp;
6 a reflector mounted in the interior of the lamp housing and surrounding the lamp;
means for mounting the lamp in the interior of the lamp housing;
8 a sapphire window extending across the forward end of the lamp housing for permitting
light from the lamp to be transmitted through the window;
10 means for providing a water-tight seal between the sapphire window and the forward end
of the lamp housing to prevent water from entering the interior of the lamp housing; and
12 an electrical circuit connected to the lamp and including means for shutting off a source of
power to the lamp upon the detection of a predetermined excessive heat condition or upon the
14 detection of leakage of water into the lamp housing.

72. A thru-hull light comprising:
2 a lamp housing having a hollow interior;
a lamp;
4 means for mounting the lamp in the interior of a first portion of the lamp housing;
a light pipe for conveying light from the lamp;
6 a second portion of the lamp housing supporting the light pipe; and
a thru-hull fitting assembly connected to a forward end of the second portion of the lamp
8 housing for mounting the forward end of the second portion of the lamp housing in a hole in the
hull of a vessel in a water-tight fashion.

73. The thru-hull light of Claim 72 and further comprising a reflector mounted in the interior of the first portion of the lamp housing and surrounding the lamp.

74. The thru-hull light of Claim 72 and further comprising a hot mirror positioned over a rear end of the light pipe that faces the lamp.

75. The thru-hull light of Claim 72 and further comprising a window made of a scratch resistant material positioned over a forward end of the light pipe that faces the water when the thru-hull light is installed in a vessel below the water line.

76. A thru-hull light comprising:
a lamp housing having a hollow interior;
a thru-hull fitting assembly connected to a forward end of the lamp housing for mounting the forward end of the lamp housing in a hole in the hull of a vessel in a water-tight fashion;
a lamp;
a reflector mounted in the interior of the lamp housing and surrounding the lamp and having a hybrid inner parabolic section and an outer elliptical section;
means for mounting the lamp in the interior of the lamp housing;
a window extending across the forward end of the lamp housing for permitting light from the lamp to be transmitted through the window; and
means for providing a water-tight seal between the window and the forward end of the lamp housing to prevent water from entering the interior of the lamp housing.

77. A thru-hull light comprising:
a lamp housing having a hollow interior;
a thru-hull fitting assembly connected to a forward end of the lamp housing for mounting the forward end of the lamp housing in a hole in the hull of a vessel in a water-tight fashion;
a lamp;
means for mounting the lamp in the interior of the lamp housing;
a window extending across the forward end of the lamp housing for permitting light from the lamp to be transmitted through the window;

at least one thermal insulating sleeve surrounding the forward end of the lamp housing; and
10 means for providing a water-tight seal between the window and the forward end of the lamp housing to prevent water from entering the interior of the lamp housing.

78. A thru-hull light comprising:

2 a lamp housing having a hollow interior;
a lamp;

4 means for mounting the lamp in the interior of a first portion of the lamp housing;
a hollow reflective tube for conveying light from the lamp;

6 a window extending across the forward end of the hollow tube for permitting light from
the lamp to be transmitted through the window;

8 a second portion of the lamp housing supporting the reflective tube; and

a thru-hull fitting assembly connected to a forward end of the second portion of the lamp
10 housing for mounting the forward end of the second portion of the lamp housing in a hole in the hull of a vessel in a water-tight fashion.

79. The thru-hull light of Claim 78 and further comprising a glass reflector surrounding
2 the lamp.

80. The thru-hull light of Claim 78 wherein the lamp is a hybrid Xenon/HID lamp.

81. A thru-hull light comprising:

2 a hollow lamp housing having a hollow interior and a forward end configured for mating
with a hole in the hull of a vessel;

4 a lamp;

a socket supporting the lamp in the interior of the lamp housing; and

6 a window made of a scratch resistant transparent material extending across and sealing the
forward end of the lamp housing for permitting light from the lamp to be transmitted through the
8 window.

82. The thru-hull light of Claim 81 and further comprising means for providing a water-tight seal between the window and the forward end of the lamp housing to prevent water from entering the interior of the lamp housing.

83. The thru-hull light of Claim 81 and further comprising a reflector mounted in the interior of the lamp housing and surrounding the lamp, the reflector having an outer elliptical section and an inner parabolic section.

84. The thru-hull light of Claim 81 and further comprising a thru-hull fitting assembly connected to a forward end of the lamp housing for mounting the forward end of the lamp housing in the hole in the hull of the vessel in a water-tight fashion.

85. The thru-hull light of Claim 81 and further comprising an end cap and means for securing the end cap to a rearward end of the lamp housing in a water-tight fashion.

86. The thru-hull light of Claim 81 and further comprising an electrical circuit connected to the lamp and including means for shutting off a source of power to the lamp upon the detection of a predetermined excessive heat condition.

87. The thru-hull light of Claim 81 and further comprising an electrical circuit connected to the lamp and including means for shutting off a source of power to the lamp upon the detection of leakage of water into the lamp housing.

88. The thru-hull light of Claim 81 and further comprising an electrical circuit connected to the lamp and including a ballast and means for shutting off a source of power to the ballast in the event of the detection of a fault in the lamp.

89. The thru-hull light of Claim 81 wherein the electrical circuit further includes means for indicating power status and/or fault status.

90. The thru-hull light of Claim 81 wherein the lamp has a color temperature of at least about five thousand K.